Notice of the Discovery of Remains of the Great Auk or Gare-fowl (*Alca impennis*, L.) on the Island of Oronsay, Argyll-shire. By Symington Grieve, Esq. (Communicated by Dr. J. Murie, F.L.S.)

[Read May 4, 1882.]

(Plate IX.)

Trustworthy evidence goes to prove that the so-called Great Auk or Garefowl (*Alca impennis*) has been extirpated within the memory of living men—the very last living ones being recorded as taken in Iceland about 40 years ago, while still earlier in the present century stray examples were got within the British area. For the history and distribution of the bird, however, I need only refer to the able writings of Professors Steenstrup*, Newton†, and others‡; and for an account of its osteology to Prof. Owen's memoir§ on the Newfoundland specimens. Its remains in the kitchen-middens of Denmark, Iceland, and North America are authenticated; but only in two instances have prehistoric remnants been found in Britain, viz. 2 humeri, 2 tibiæ and fragments, and portion of a premaxilla by Mr. S. Laing, at Caithness, and the front moiety of a sternum afterwards obtained from the same place by Dr. J. Anderson‖.

(Since the above was written, my attention has been called to the Nat. Hist. Trans. of Northumberland and Durham, vol. vii. part ii. (1880), pp. 361–364, where it is mentioned some Gare-fowl-remains were found in a limestone cave near Cleadon, on the Durham coast, during 1878.)

The rarity of this interesting avine form, and the fact of its

* "Et Bidrag til Geirfuglens" &c., in 'Videnskabelige Meddelelser' for Aaret 1855 (Kjöbenhavn, 1856–57), pp. 33–116.

† Ibis, 1861, pp. 374–379, 1870, p. 256, and Encycl. Brit. 9th ed. 1875, article "Birds."

‡ Among these may be mentioned "The Gare-Fowl and its Histories," Nat. Hist. Rev. 1865, p. 467; and 'Ueber *Plautus impennis* von W. Preyer,' 1862, for a separate copy of which I am indebted to the author since the reading of the present paper.

§ Trans. Zool. Soc. vol. v. p. 317 (1865).

‖ Consult 'Prehistoric Remains of Caithness,' 1866, by Samuel Laing, M.P.; also "Notice of the Remains of Garefowl in Scotland," by Dr. J. Alex. Smith, in Proc. Soc. Antiquaries Edinb. 1879, pp. 76–105. The portion of sternum in Mus. Coll. Surg. Lond. is numbered 1150 B, and was presented by Mr. G. Busk, through Dr. J. Anderson, and got at Keiss, Caithness.

being obtained in a new locality along with other animal débris under peculiar conditions, warrant my offering the present contribution to the Society.

During the summer of 1879 the writer formed one of a small party who visited the island of Colonsay, to which is attached at low water the islet of Oronsay, the intervening strand being dry for about three hours each tide. Finding we had entered upon a new field for study, we began to make a list of the flora, which has been published in the Trans. Bot. Soc. Edinb. (vol. xiv. parts 1 & 2). In the beginning of May 1880 we returned to the islands, and were struck with the remarkable appearance of a cone-shaped mound, on the eastern side of Oronsay. We shortly afterwards learned that Pennant, when he visited the island in 1772 *, had noticed the place, and describes it as a tumulus. Our repeated inquiry among the islanders as to what the mound was, or if they knew any tradition regarding it, resulted in their only knowing it by the name of Caisteal-nan-Gillean †.

Having in the winter following made the acquaintance of Mr. William Galloway, well known for his antiquarian researches in Scotland, and finding that some years previously he had visited Oronsay, we agreed to revisit the island, and did so early in June 1881, in company with Mr. Alex. Galetley, curator of the Museum of Science and Art, Edinburgh.

Permission to make an excavation having been granted by Mr. Malcolm McNiell, the brother of the proprietor of the islands (Sir John Carstairs McNiell, V.C.), we proceeded forthwith. Our cutting was commenced at the base, and we worked inwards, but found the labour toilsome, and even dangerous, as large quantities of sand were continually falling overhead. At last we found it impossible to work straight in upon the same level on which we started, and had gradually to work upwards, keeping the bottom of our trench about ten feet from the surface as we steadily excavated towards the middle of the mound.

While we were engaged in digging, Mr. Galloway was busy measuring and marking off the ground. He ascertained that the hillock is 150 feet in diameter, and nearly circular in form, the height being about 30 feet on the eastern side, which gives the greatest elevation, as the ground rises considerably on the west. On the south-east of the mound there is a sand-pit, whence pro-

* Pennant, 'Tour through the Western Isles,' Lond. 1772.

† In the Gaelic literally the Castle of the Servants (Gillies or followers).

bably has been derived the sand which covers all but the inner crust of this remarkable hillock. At the end of three days, we found we had made a cutting about 70 feet in length, and were close to the apex. By this time we had discovered abundance of shells, a few bones, and some rough stone implements, and with these we started for Edinburgh. Of this material Mr. Galetley undertook examination of some, and Dr. Traquair, F.R.S., and his assistant, Mr. John Gibson, identified others. The two latter gentlemen simultaneously were struck with the remarkable form of a humerus of a bird, and guessed it to be that of the rare and extinct Garefowl, which surmise turned out to be correct.

The mound of Caisteal-nan-Gillean, on Oronsay. The "Paps of Jura" and N.E. extremity of Islay in the distance. From a photograph by Mr. Galloway, reduced.

This discovery gave so much encouragement, that it led us to make arrangement to return to Oronsay in August and continue the excavations. Mr. Galloway started about the middle of the month, and remained working for six or seven weeks; I was fortunate in being able to spend about a week in his company.

During this visit we were employed removing the upper part of the mound, where the greatest deposits existed, as our expe-

rience showed us that if it had been raised over any thing, or was the superstructure covering a place of interment, we could only ascertain this by digging down to the living rock, which is about 3 feet below the original level of the sand at the outer edge of the mound, and possibly is the same under the apex. As the falling sand made this work very dangerous, we proceeded to remove about 12 feet of the upper part of the hillock, and then to dig downwards, as circumstances permitted. By the end of September fully one third of the apex had been dug off, and every spadeful most carefully examined, so that not even the minutest object could be passed. The same rule has been followed all through; and though the work went on so much more rapidly during our first visit, it was entirely owing to the fact that we had mostly pure sand to deal with: this contained not a vestige of remains, and seemed as if deposited from the sand-pit. To give some idea of the nature of the deposits as revealed by the sections examined during the digging, we may state that the outside of the cone is covered with grass, and beneath this with turf and blown sand to a depth varying from one to five feet, the greatest depth being at the north side of the apex * and gradually thinning off all round to the outer edge. Below that is a series of strata, composed principally of shells, which taper off from the apex similar to the upper deposit, and underneath these is pure sand. Where we began our excavations we found almost solid sand; then, after a few feet, we came upon a thin layer of shells near the surface, which was at first only about an inch thick, but as we worked inwards we found this line gradually getting thicker, until near the summit it was composed of numerous layers which were pretty clearly defined, though here and there they ran into each other, and altogether were about 8 feet from top to bottom.

The greater part of the shells were those of the Limpet (*Patella vulgata*, L.); however, others were intermixed; and besides these were a few bones, bone-implements, and oblong water-worn stones of a slaty character, some of which, we suppose, have been used as limpet-hammers, which we shall speak of presently. Others have one end rubbed so as to form an edge, and are similar in appearance to prehistoric implements from the Swiss lake-dwellings, and also from Orkney, Shetland, and Wigtonshire. There are also a few oval and nearly round stones that showed

* The strong south winds have blown the sands northwards, causing the accumulation on that side of the mound.

marks of having been used for striking, along with some stone-heaters cracked by the action of fire, and, in addition, a few pieces of flint of small size. Of bone-implements we got several, but all in a fragmentary state. They consisted of two harpoon-heads (the one opposite, and the other alternately barbed), one bone-awl in a perfect state, and the point of another; also a number of bones rubbed at one end, some on both sides, so as to give an edge, and others only on one side; but most likely they were used for different purposes, as those rubbed flat only on one side are larger, and made of selected pieces of the bones of Red Deer, while some of those with the rubbing on both sides, so as to form an edge, are made of the same material; portions of smaller bones have been used. In digging we came across some large flat stones, which had evidently been used as hearths; for they had charcoal and burnt material around them, but not in sufficient quantity to give the impression that they had been used for any great length of time; and it was generally in the immediate neighbourhood of those ancient fireplaces that we got the implements. The charcoal is very soft, and has the appearance of having resulted from the burning of a soft wood. In the bed of Loch Fada, in Colonsay, are stumps of immense trees that may at one time have furnished the inhabitants with fuel. Being desirous to ascertain whether the charcoal and the wood from these tree-stumps agreed in structure, we placed specimens of each in the hands of Mr. J. M. Macfarlane, B.Sc., Assistant to the Professor of Botany in the University of Edinburgh. He has identified the wood as that of the Goat Willow * (*Salix caprea*, L.), though it is difficult to say categorically whether this and the charcoal are identical.

The remains in the lowest deposits near the summit differed in some respects from those found nearer the surface. All are of a very rough description, indicating that the mound was used by a primitive and probably ancient people. In fact the question naturally arises, What can there be underneath that would account for this sand-hill? The latest excavations, carried on during the month of March this year (1882) by Mr. Galloway, show that the sand below the strata in which we have found the remains is not one vast homogeneous mass that has been accumulated at one time, but is all blown or drift sand laid in regular layers, the upper part of each defined by a thin line of dark mould, with a

* In the Hebrides the willow was used for making bridles, ropes, and tackle of every variety.

few sea- and land-shells intermixed; but no implements or other remains have yet been met with in these lower deposits. The conclusion that all seems to point to is, that the lower part of the Caisteal-nan-Gillean has been formed by natural, and not human agency.

Garefowl-bones described by Mr. Gibson (see Plate IX.):—

1. *Right humerus*, measuring 4 inches in length, and 1 inch in breadth at the proximal end. The compressed shaft at its middle portion measures 6 lines in long diameter, and nearly 3 lines in short diameter. According to Professor Owen (Trans. Zool. Soc. vol. v. p. 327), there is a thick ridge or raised rough surface near the radial end of the articular head of the humerus, extending about 8 lines down the bone, which gives insertion by a well-marked narrow elliptical depression to the second pectoral muscle, the raiser of the wing. In the present specimen the bone of the ridge exhibits a diseased condition, the normal depression being changed into a deep trough 8 lines in length and 4 lines broad.

2. *Proximal half of right humerus.*—Total length of specimen $2\frac{1}{2}$ inches; broken about the middle of the shaft, which exhibits medullary cavity. This cavity measures $2\frac{1}{2}$ lines in long diameter by 1 line in short diameter, the shaft measuring similarly 6 lines by $2\frac{1}{2}$ lines.

3. *Distal half of left humerus.*—Specimen measuring 2 inches 2 lines; shows medullary cavity. In this specimen the condyle and the three anconeal ridges are very perfect.

4. *Distal end of left humerus*, 3 inches in length.

5. *Left coracoid bone*, with a total length of 2 inches 4 lines. At the sternal end it is 10 lines in breadth; but as both ends are imperfect, it probably had a breadth of at least 1 inch. The thin lamelliform process given off above the sternal articulation is also gone; otherwise the coracoid is entire. From the sternal end it gradually contracts to 5 lines, then widens out, giving off a strong, compressed process, which is perforated.

6. *Upper half of right coracoid.*—Specimen $1\frac{1}{4}$ inch in length, ending a little below the perforated process.

7. *Distal end of right tibia.*—Specimen 1 inch in length; shaft showing very minute medullary cavity.

8. A dorsal vertebra.

In addition to the above, Mr. Galloway has likewise discovered a number of other remains, among which we may mention several

upper and lower portions of humeri, lower ends of tibiæ, and entire femora, &c.

We have therefore doubtless the bones of a large number of Garefowl and aquatic birds.

The following is a list of the other animal-remains from the mound:—

Mammals.

Cervus elaphus, L. Red Deer. Many of the bones have been rubbed.
Martes foina, L. Marten.
Lutra vulgaris, Erxl. Otter.
Ovis aries, L. Sheep. We have only one portion of a bone that we are certain belongs to this animal; and it was found near the upper surface of the deposits, and is in better preservation than the other remains, which may indicate it is more recent.
Mus decumanus, Pall., or *rattus*, L. Rat.
Lepus cuniculus, L. Rabbit. Found in old burrows; and the remains appear to be recent.
Phoca vitulina, L. Common Seal.
Sus scrofa. Pig.

Birds.

Uria troile, L., or *grylle*, L. Guillemot. And several other shore-frequenting birds, of which furculæ, coracoids, scapulæ, humeri, and femora remain for the present undetermined.

Fish.

Labrus maculosus, Bl. Wrasse.
Mugil septentrionalis, Günth. Grey Mullet.
Acanthias vulgaris, Risso. Picked Dog-fish.
Raja batis, L. Skate.

Crustaceans.

Platycarcinus pagurus, Edw. Crab.

Shells.

Patella vulgata, L. Limpet.
Pecten opercularis, L. Scallop.
Ostrea edulis, L. Oyster.
Buccinum undatum, L. Horse Whelk.
Littorina littorea, L. Periwinkle.
Cyprina islandica, L.
Lævicardium norvegicum, Spengl.
Axinæa glycymeris, L.
Cardium edule, L. Cockle.
Tapes pullastra, Mont.
T. virgineus, L.
Venus casina, L.
Ensis siliqua, Linn.
Trivia europæa.

With regard to these remains, we may observe that the bones of the Red Deer, though found all through the strata, even in the highest, were most plentiful in the lower deposits, and seemed to become much less common in the upper layers. It would seem that this probably indicates that the animal was becoming gradually less abundant during the period that Caisteal-nan-Gillean was inhabited. We may also remark that, as in our excavations at the Crystal-Spring Cavern, Colonsay, we only found the bones of the Red Deer in the lowest deposits of the cave-floor, it appears therefore that there is good reason to suppose that the

time at which the upper deposits at the mound were formed and the earliest deposits of the cave is about the same. Moreover, as the Deer-remains in the cave are not found very frequent, it is quite possible it was only occupied after the mound had ceased to be a place of human residence. If our conclusions upon this point be correct, the mound must have been occupied at a very early period in the history of the isles, as we find in the upper deposits of the cave-floor, and above the strata in which we have found the Deer-bones, other remains which point to these having been formed during the Danish or Norwegian occupation of Colonsay and Oronsay.

Another evidence of the antiquity of the mound is in the absence of Ox-remains, which are met with in the upper deposits of the cave under stalagmite. The remains described as those of the Pig may possibly belong, not to the domestic Hog, but to the Wild Boar. As Sir John Lubbock remarks*, Professor Steenstrup does not believe that the domestic Hog is represented by its remains in the Danish shell-mounds; and, besides, one of the rib-bones in our possession bears evidence of having been broken and afterwards having united, and such an injury, it seems to us, would most likely be received in the chase.

One remarkable feature of the deposits at Caisteal-nan-Gillean is the immense number of Limpet-shells, very many with small holes in them, caused, we believe, by the stroke of the rough stones used as hammers to knock them off the rocks. Almost all the stone-implements are just suitably-shaped stones taken from the beach; but nearly all those found in the neighbourhood of the hearths bear marks of having been rubbed at the one end, and, with two exceptions, are all small, varying from 2 to 3 inches in length; while many of the stones we call limpet-hammers are quite a foot in length, and, with the exception of being sometimes fractured at the ends, bear no evidence of having been used. Nearly all these are found lying among the thinner deposits of shells away from the centre of the mound, as if they had been thrown there to be out of the way from the hearths. Our reason for calling them limpet-hammers is as follows:—We had been making inquiries among the islanders for those implements, but without success, as we understood they were carefully fashioned or selected stones that were handed down by the fishermen from father to son; and we found that most of

* 'Natural History Review,' 1861, p. 497.

the men used the blade of an old reaping-hook to knock the Limpets off the rocks. However, we also discovered that, failing an instrument of that kind, they then took an oblong-shaped stone from the beach. The second day of our excavations at Caisteal-nan-Gillean we were puzzling ourselves as to what could be the use of the numerous oblong stones we met with among the shells, and mentioned the matter to our workman, who was accustomed to go to the fishing, and he seemed, just as a matter of course, to inform us that they were limpet-hammers. He assured us that he and his fisher-mates often took such stones from the beach when proceeding on a trip, and would retain the stone for collecting bait until the end of their fishing, when they would throw it away. Subsequent inquiries have only helped to confirm us in the opinion that the large oblong stones found at Caisteal-nan-Gillean are really limpet-hammers. We understand that similar stones have been found in the ancient kitchen-middens of other localities, and have proved a puzzle to antiquarians; but we think what we have stated will be found to be the real solution of the mystery.

DESCRIPTION OF PLATE IX.

All the bones are drawn of natural size.

Figs. 1–5. Dorsal vertebra shown in its different faces:—1, side view; 2, from above; 3, from below; 4, in front; 5, from behind.

Figs. 6–8. The entire left coracoid in three aspects:—6, exterior; 7, interior; 8, its antero-inner edge.

Fig. 9. Upper moiety of right coracoid, viewed from the front and inside.

Figs. 10–14. Different views of the right humerus:—10, posterior surface; 11, anterior surface; 12, external front edge; 13, superior condyloid extremity; 14, inferior condyloid extremity.

Fig. 15. Distal segment of left humerus.

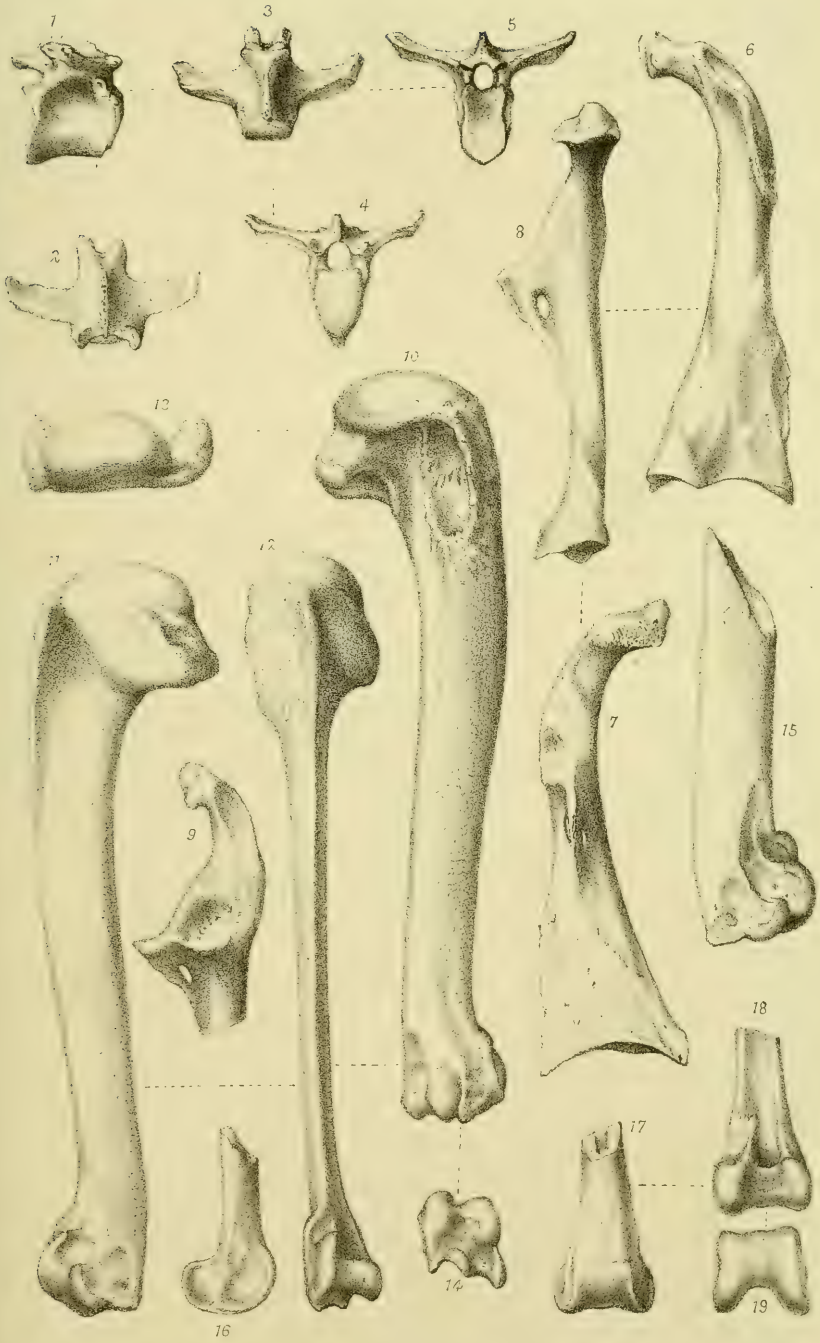
Figs. 16–19. Different views of the distal end of the right tibia:—16, interior; 17, posterior; 18, anterior; and 19, the inferior face.

Descriptions of new or little-known *Comatulæ*.—I. & II.

By P. Herbert Carpenter, M.A., Assistant Master at Eton College. (Communicated by Dr. W. B. Carpenter, C.B., F.R.S., F.L.S.)

[Read June 1, 1882.]

The two following articles are the commencement of a series which I propose to offer to the Society from time to time, containing descriptions of *Comatulæ* that are either entirely new or but little known to zoologists. In all the principal museums of the Conti-



Bagster lith. BONES OF GREAT AUK, *Nat size.* Hanhart imp.